

# inApril

**Selected slides from:  
The Ocean Bottom Seismic Market**

**September 2017**

**ARKWRIGHT**

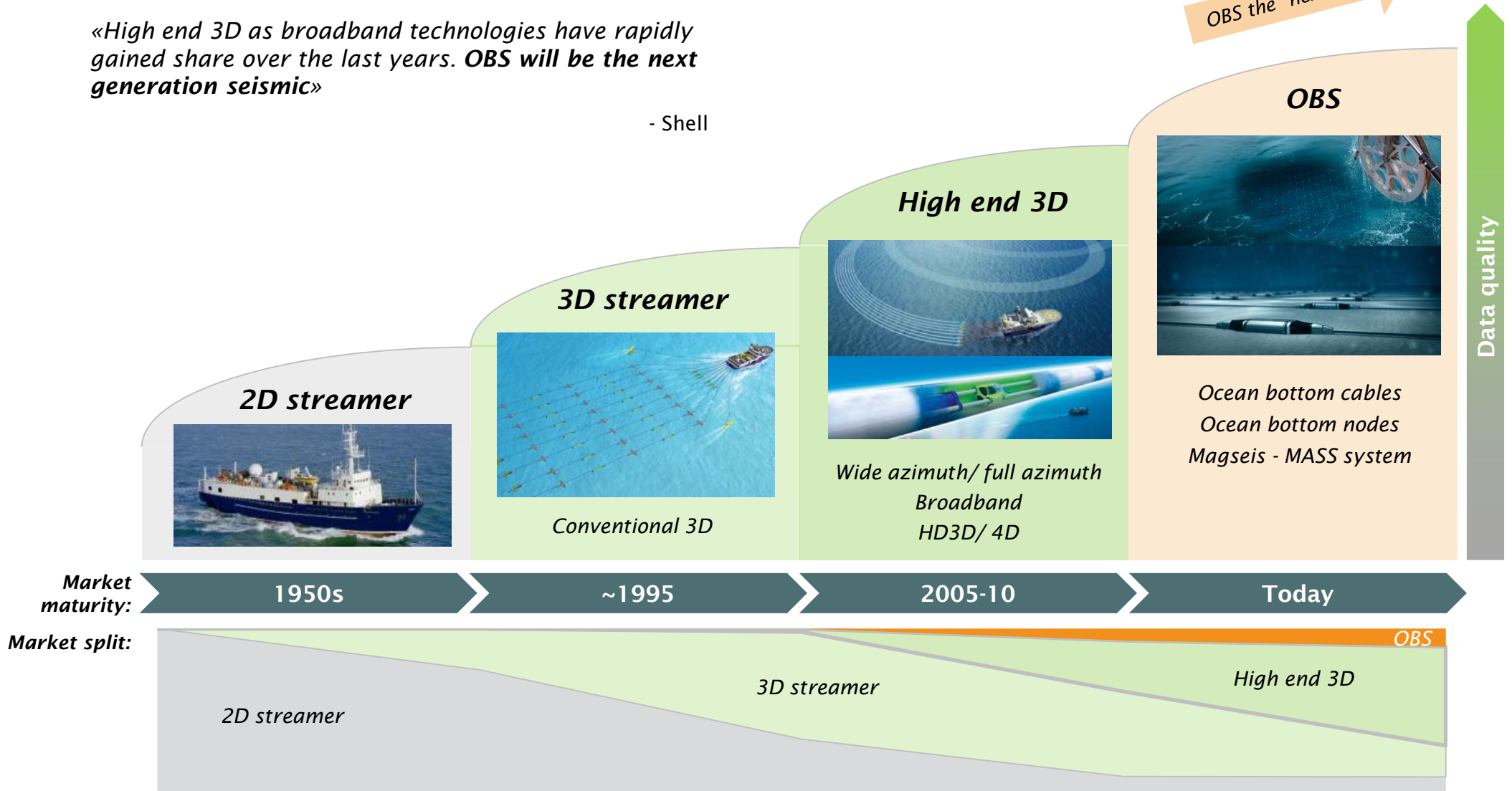
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# The seismic market has historically evolved towards more advanced technologies with enhanced data quality - OBS can be the next leap

«High end 3D as broadband technologies have rapidly gained share over the last years. **OBS will be the next generation seismic**»

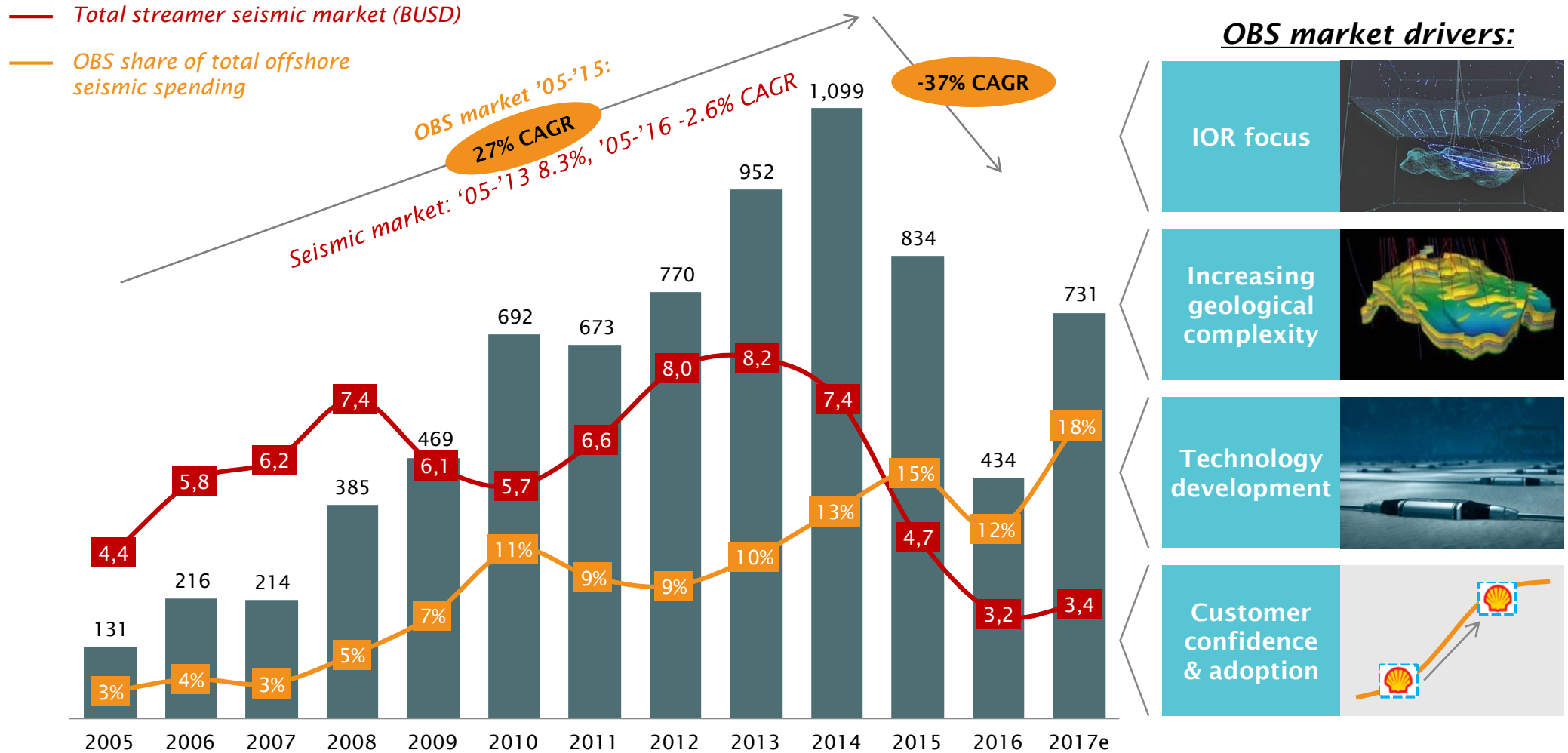
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OBS the "next leap" →



# OBS market with strong growth 2005-15, but severe downturn in 2016

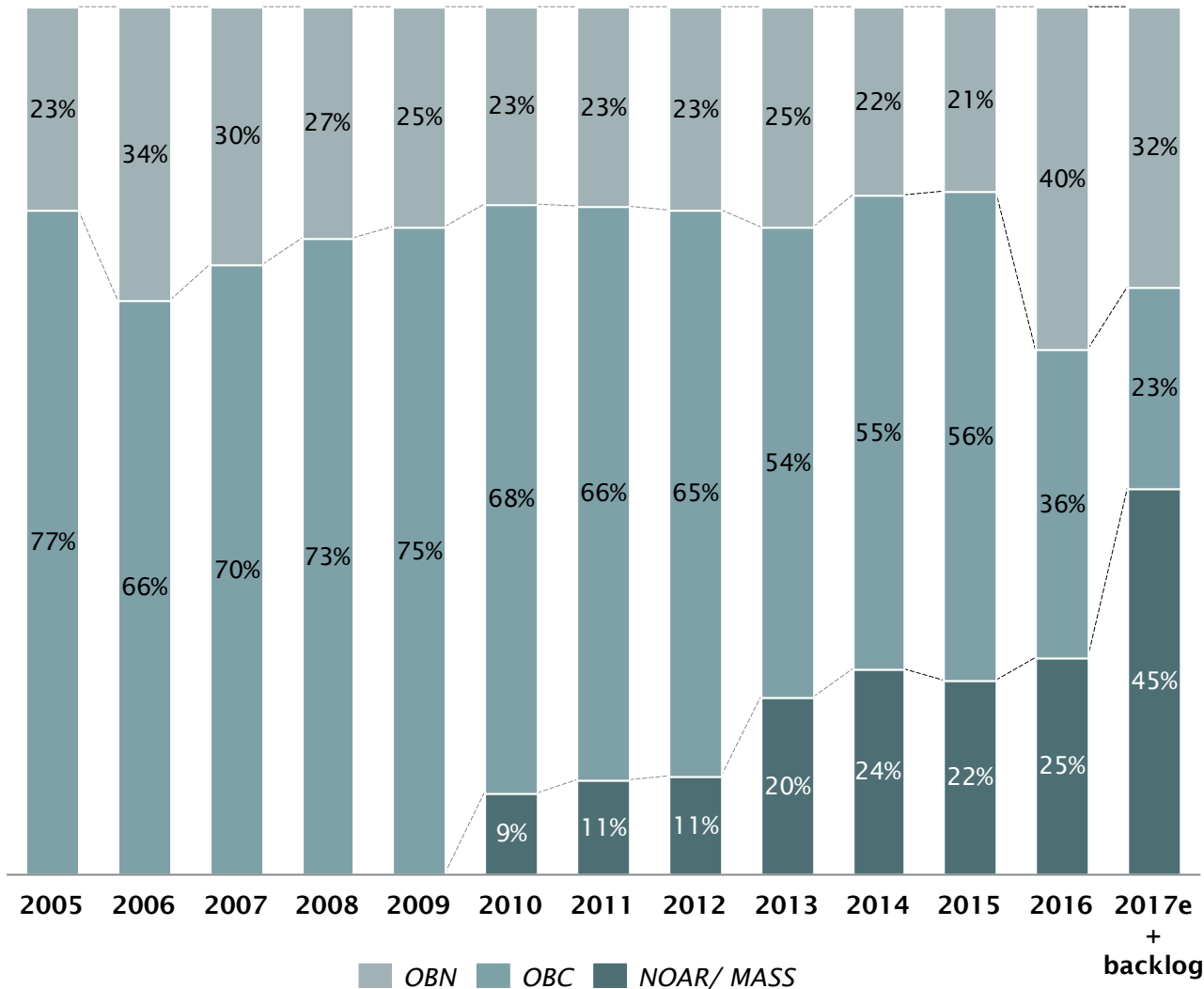
Historical OBS market development (MUSD)



# Nodes-on-a-rope has rapidly gained traction over OBC since 2010, while OBN market share has remained historically stable

## Historical market share development

Based on historical market value



## Observed trends

1

### Stable OBN market share

- Steady flow of OBN projects in the pipeline, in parallel with steady supply of OBN crews
- Deep water OBN crew launched in 2006 by Fairfield Nodal, contributing to spike in market share that year
- Two large OBN contracts awarded late 2015 skewing 2016 figures

2

### NOAR/MASS gaining traction

- Nodes-on-a-rope has captured market shares from OBC since the launch of the first crew by Fairfield Nodal in 2010
- Large share gained in 2013 because of large capacity expansion by Fairfield Nodal and establishment of Magseis

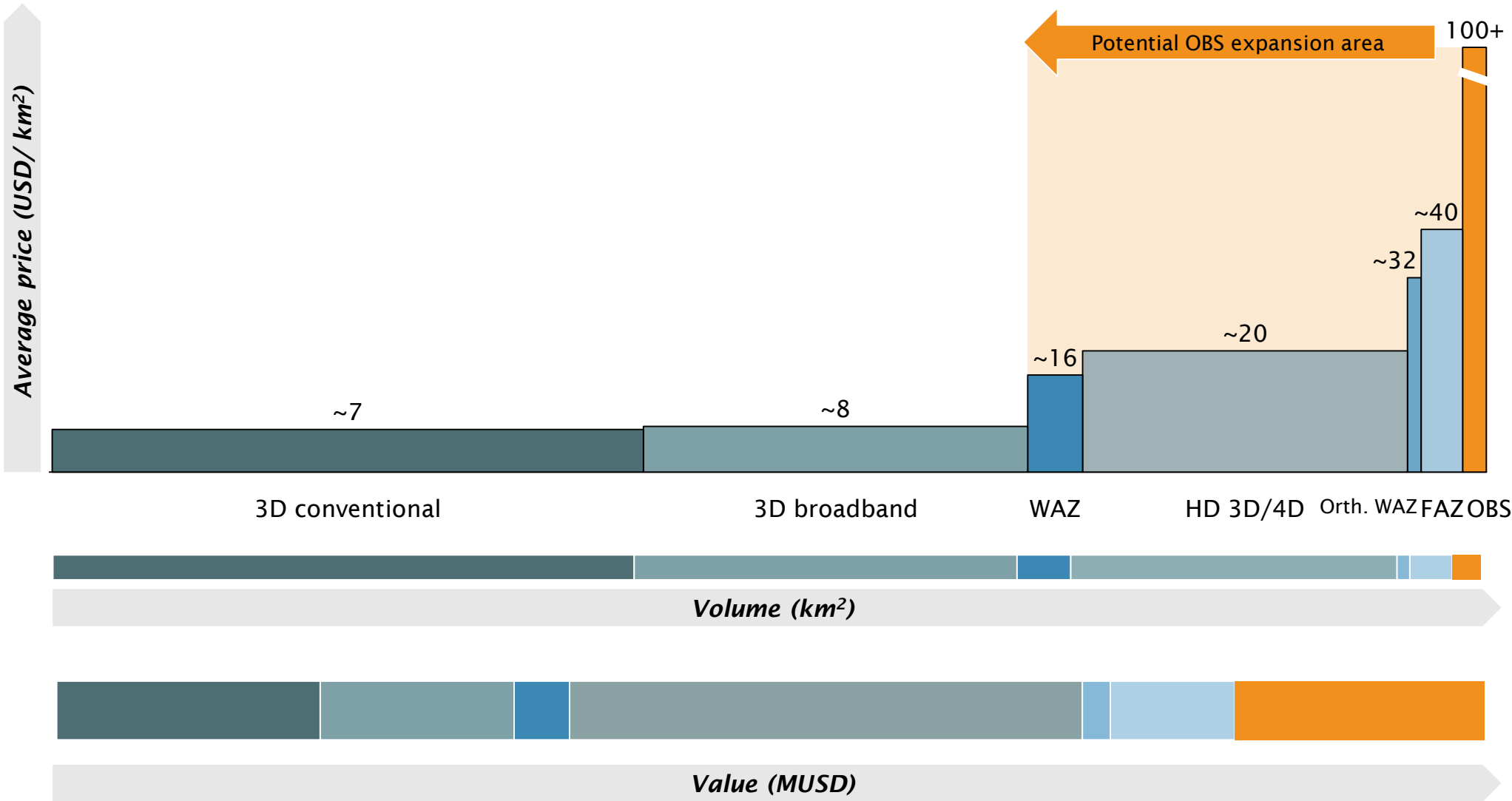
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### OBC losing market share to NOAR

- OBC with strong and stable position from 2005 to 2010. RXT with gradual supply ramp-up in this period
- However, OBC supply has since 2010 experienced significant reduction in supply, due to RXT financial distress and NOAR gaining stronger position

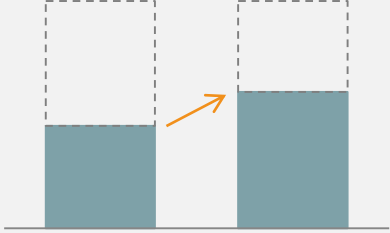
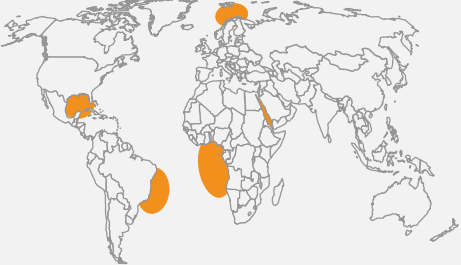
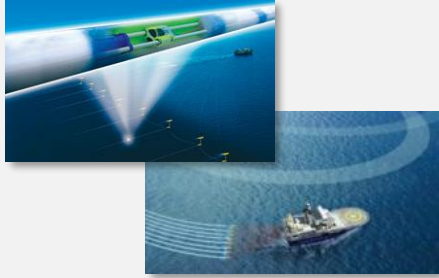
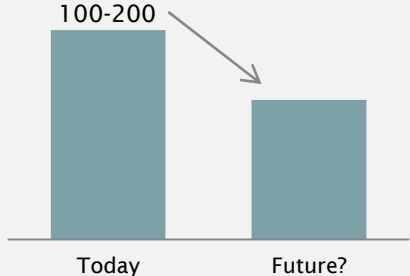




# OBS a market yet representing a small share of the annual acquisition volume, although more than 10% of market value

Historical 3D/ 4D seismic acquisition market breakdown



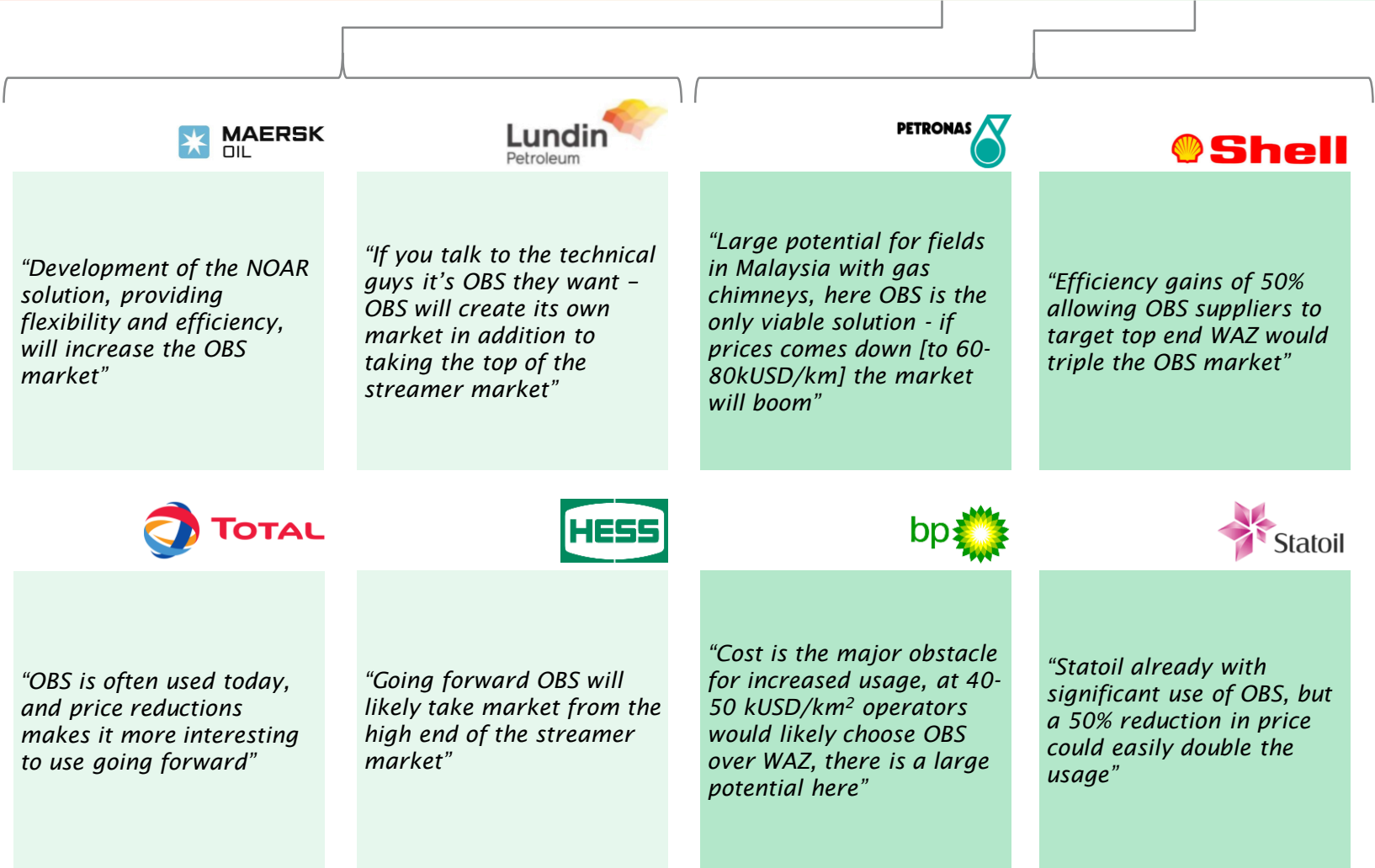
# Favorable long term fundamental drivers for the OBS market

## Fundamental drivers for the OBS market

IOR focus	Increasing geological complexity	Growing high end streamer market	Increased OBS net value creation fueled by lower costs
<p>Enhanced recovery rates by using OBS</p> 	 <p>■ Significant amounts of allochthonous salt</p>		
<p>Increased recovery rates from existing fields highly prioritized - need for superior reservoir imaging</p>	<p>Significant imaging challenges due to geological complexity in areas as GoM, Brazil, West Africa and the Red Sea</p>	<p>Growing high end seismic market resulting in a larger market space for OBS to grow into</p>	<p>More operators willing to use OBS if the price premium is reduced</p>
<p><i>“OBS has <b>substantial further potential within IOR and reservoir monitoring</b>”</i></p> 	<p><i>“Huge issues with gas chimneys in Malaysia that WAZ and HD 3D/4D can’t handle. Thus, <b>there will be increased OBS activity in the future from our side</b>”</i></p> 	<p><i>“Demand for <b>dense 3D and high quality data will drive the growth for OBS</b>”</i></p> 	<p><i>“Efficiency gains of 50% allowing OBS suppliers to target top end WAZ <b>would triple the OBS market</b>”</i></p> 

Increased OBS adoption among operators

# Operators are confident in significant OBS market growth long term provided reductions in survey cost

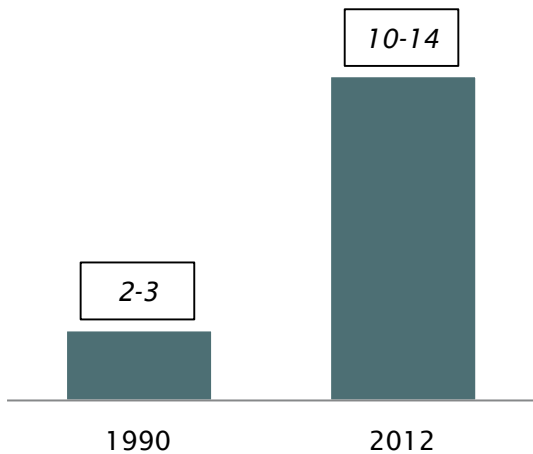


# Historical development in 3D streamer market provides a point of evidence on the market impact of increased efficiency

## Development of seismic 3D streamer market from 1990-2012

Efficiency improvements driven by technology development...

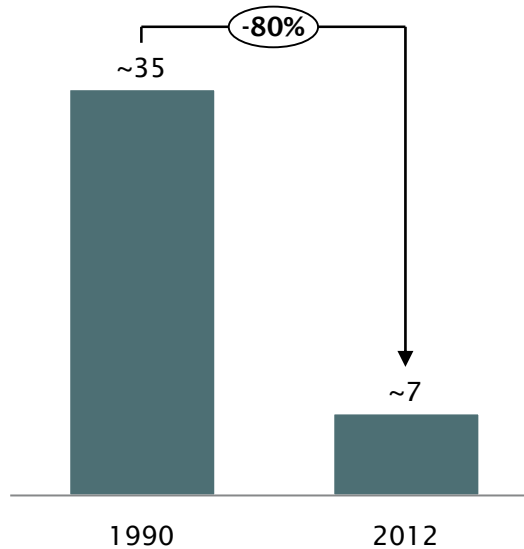
Number of streamers



More streamers per vessel reduced acquisition time...

...consequently reduction in price...

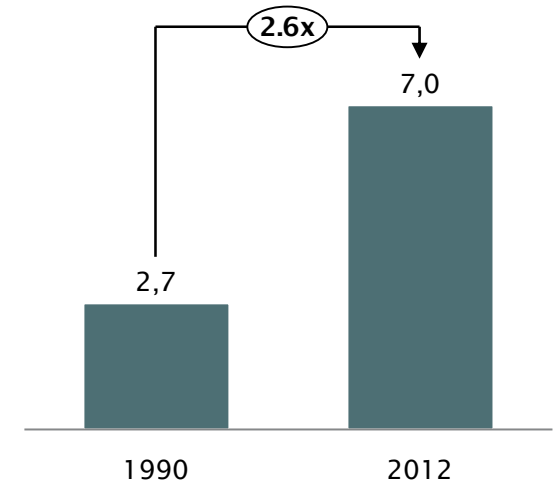
Numbers in kUSD/km<sup>2</sup>



...reduced acquisition time in turn reduced cost

...and significant market growth

Numbers in BUSD<sup>1)</sup>

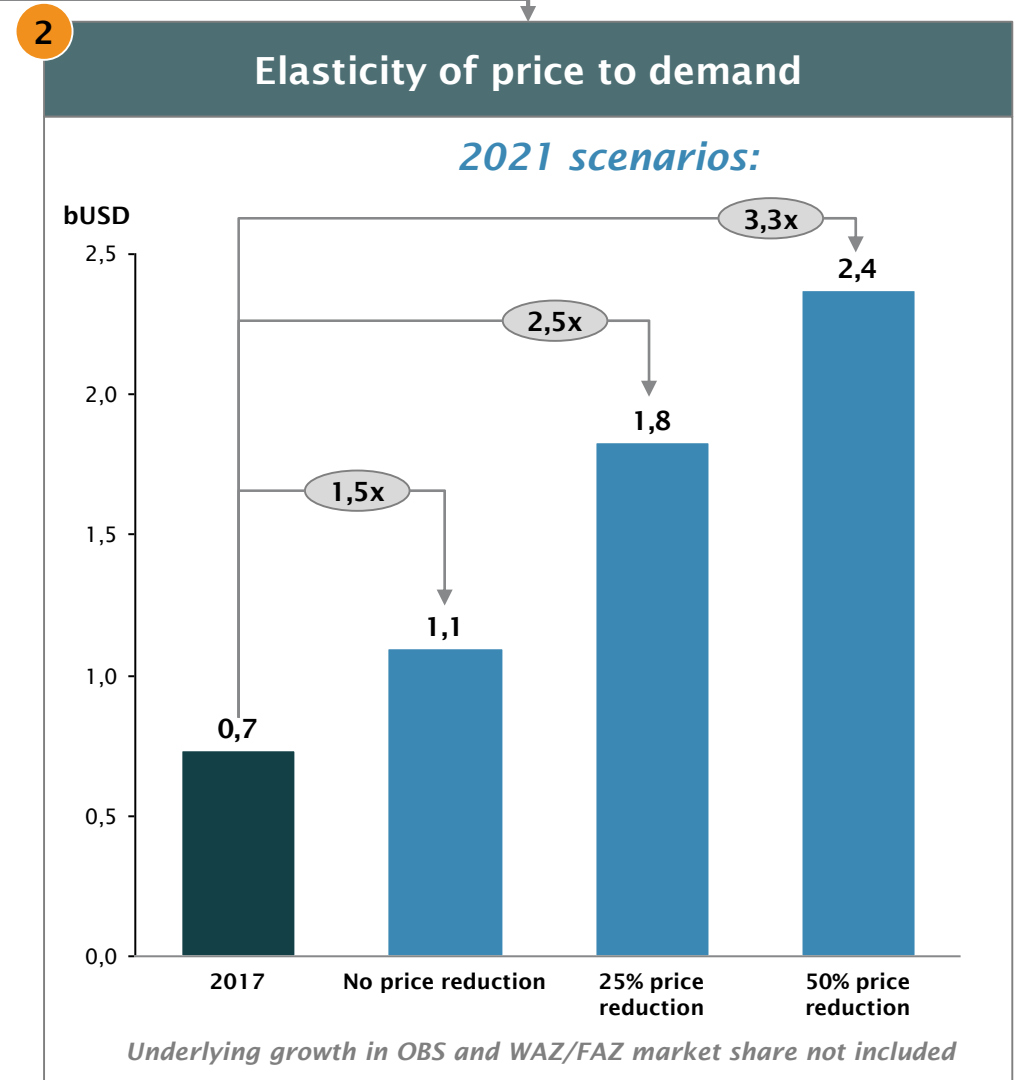
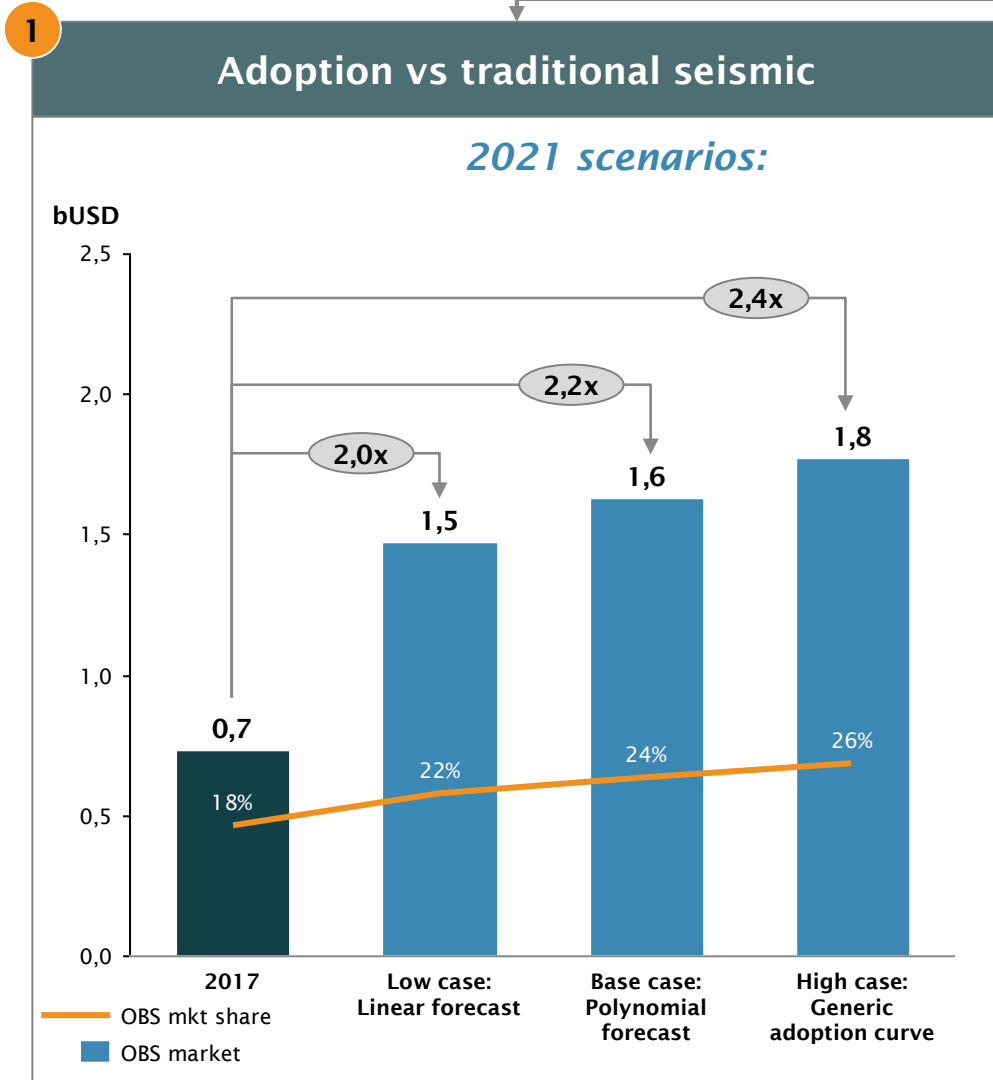


Market growth of ~160% from 1990-2012

A similar development can be expected for the OBS market if technology innovation drives efficiency gains



# Different approaches to size the potential OBS market in a 4-5 year perspective yields 2-3x current market



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